Honeywell

FF-SNC

Safety Non Contact Switch
Instructions for use

Suitable for interfaces up to CATEGORY 3 per EN 954-1

c UL US LISTED (pending)

⚠ WARNING
IMPROPER INSTALLATION
- Consult with US and/or European safety agencies and their requirements when designing a machine control, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

PRODUCT DESCRIPTION

The FF-SNC Honeywell safety non contact switch is a tamper resistant safety system for monitoring machine guards. The actuator being a passive component, the safety switch is the only component that needs to be wired to the control unit and cannot be defeated by a regular magnet.

Each system is made up of one or several safety switches, actuators and a control unit. The Honeywell FF-SNC safety non contact switches are designed in compliance with the requirements of the EN 954-1 European Standard for Category 3 Protective Devices.

The FF-SNC is especially suited for applications where perfect door alignment can not be attained. The FF-SNC Series can be mounted on sliding, hinged or removable machine guards. The output of the control unit is triggered as soon as the distance between the safety switch and the actuator is greater or equal to 8 mm/0.32 in. This switching distance compensates for the machine vibration or a minor issue with the installation alignment. The sensor and actuator small size makes it usable under tight space requirements. The safety switches and the actuators provide excellent chemical and mechanical resistance. Stainless steel housing versions fulfil the requirements of the Food and Beverage industry.

The FF-SNC400 safety control unit comes in a 75 mm / 2.95 in package and can monitor up to 4 sensors.

The FF-SNC200 safety control unit with its 22,5 mm / 0.89 in width will easily find a place in the electrical cabinet and can monitor 2 sensors. Both control units can be placed up to 100 m / 328 ft away from the safety non contact switches. The indicators located on the front cover of both control units provide individual door status information.

The FF-SNC1EXT extension module can be added to the FF-SNC400 or FF-SNC200 control unit and allows the connection of 5 additional sensors.

APPROVALS

CE	The product, packaging and documentation of FF-SNC Series products is CE mark following an examination by TÜV.
cULus	This product is pending approval at Underwriters Laboratories Inc. According to Canadian and U.S. safety requirements.

DIRECTIVES COMPLIANCE

Machinery Directive 98/37/EC
Low Voltage Directive 73/23/EC
Electromagnetic Compatibility Directive 89/336/EC

REGULATIONS COMPLIANCE

Regulation	Title
OSHA 29 CFR 1910.212	General Requirements for (guarding of) all Machines
OSHA 29 CFR 1910.217	Requirements and Safeguarding of Mechanical Power Presses

STANDARDS COMPLIANCE

Standard	Title
EN 292	Safety of Machinery – Basic Concepts, General Principles for Design
EN 60204	Safety of Machinery – Electrical Equipment of Machines
EN 954-1	Safety of Machinery – Safety related parts of control system
EN 1088	Interlocking Devices associated with Guards
ANSI B11.1	Construction, Care and Use of Mechanical Power Presses
ANSI B11.2	Construction, Care and Use of Hydraulic Power Presses
ANSI B11.19	Safeguarding Performance Criteria for the Design, Construction, Care and Use
ANSI/RIA R15.06	Safety Requirements for Industrial Robots and Robot Systems
UL 508	Industrial Control Equipment
UL 991	Test for Safety related Controls employing solid state devices
NFPA79	Electrical Standard for Industrial Machinery

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SPECIFICATIONS

Switch	
Material	ABS (FF-SNC1SA03PA) or Stainless Steel and Resin filled (FF-SNC1SA03PS)
Sensing range	5-7 mm / 0.20 – 0.27 in On; 8-12 mm / 0.32 – 0.47 in Off
Optimum gap	1 mm
Standard cable length	3 m / 9.84 ft or 5 m / 16.4 ft
Operating temperature	-10 °C to +55 °C / 14 °F to 131 °F
Connection to the control unit	Max. Cable length: 100 m / 328 ft
Sealing	IP 67
Fixing	2 x (M4x20 mm) Tamper proof screws (supplied with the product)
Control unit / Extension module	
Category	Category 3 according to EN 954-1
Supply voltage	24 Vdc/Vac ± 15 % / 110 Vac ± 15 % (FF-SNC400R4 only)
Response time of the control unit	15 ms (with or without extension module)
Power consumption (including sensors)	6 VA (with or without extension module)
Operating temperature	-10 °C to + 55 °C / 14 °F to 131 °F
Storage temperature	-20 °C to 60 °C / -4 °F to 140 °F
Output	2 NO + 1 NC contacts (4 A / 250 Vac; 2 A / 30 Vdc)
Restart	Manual or automatic
Sealing	IP 40 Housing, Terminals IP 20
Mounting	35 mm / 1.37 in DIN rail
LED indicators	FF-SNC200R2 control unit: Power, Run and 2 guard status indicators FF-SNC400R4 control unit: 4 guard status indicators and selection indicators
Material	Polycarbonate, red

Ordering information:	**Description**	**Weight**
FF-SNC200R2	24 Vdc/Vac Control unit for monitoring up to 2 gates:	0,235 kg / 0.517 lb
FF-SNC400R2	24 Vdc/Vac Control unit for monitoring up to 4 gates:	0,49 kg / 1.078 lb
FF-SNC400RE	110 Vac Control Unit for monitoring up to 4 gates:	0,63 kg / 1.386 lb
FF-SNC1SA03PA	Safety switch + actuator: 3 m / 9.84 ft cable:	0,169 kg / 0.371 lb
FF-SNC1SA05PA	Safety switch + actuator: 5 m / 16.4 ft cable:	0,255 kg / 0.56 lb
FF-SNC1SA03PS	Safety switch + actuator: 3 m / 9.84 ft cable – Stainless Steel Housing	0,265 kg / 0.583 lb
FF-SNC1ACS	Actuator Only: Stainless Steel Housing	0,077 kg / 0.169 lb
FF-SNC1ACA	Actuator Only : ABS Housing	0,028 kg / 0.061 lb
FF-SNC1EXT	Extension Module	0,135 kg / 0.297 lb

MOUNTING DIMENSIONS (mm/in) for reference only

FIG 1. FF-SNC Control unit

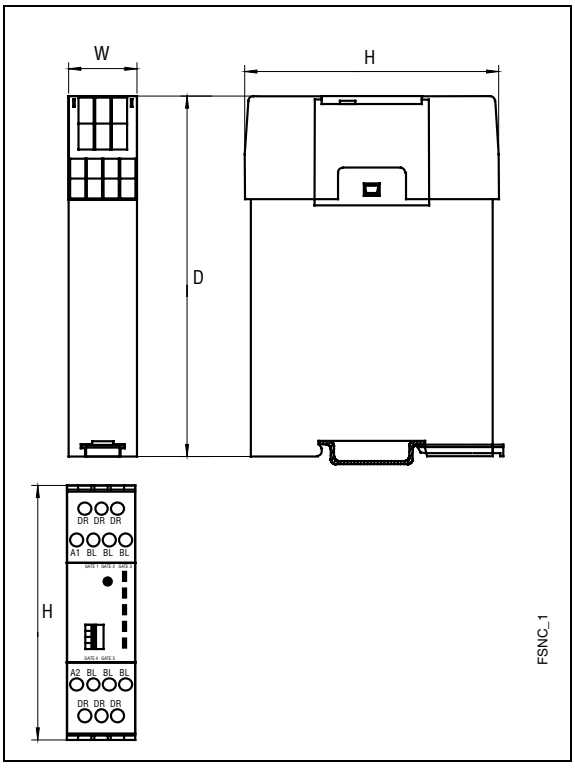
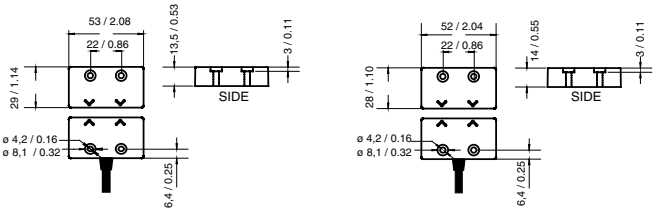


FIG. 2. FF-SNCS1A03PS - FF-SNCS1A03PA



	FF-SNC200R2 FF-SNC1EXT	FF-SNC400R2 FF-SNC400RE
W	22,5 / 0.88	75 / 2.95
H	84 / 3.30	74 / 2.91
D	119 / 4.68	119 / 4.68

(in mm/in)

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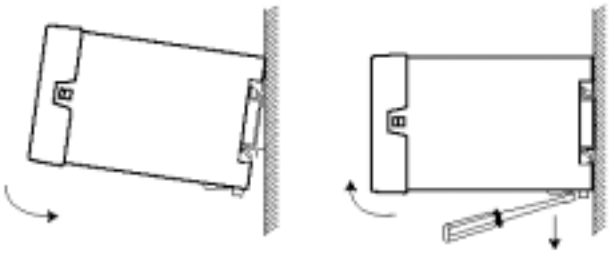
MECHANICAL INSTALLATION

The FF-SNC Control unit must be installed inside a NEMA 3 (IEC IP 54) rated enclosure or better. The module can be clipped easily onto a 35 mm (1.38 in.) width DIN rail (see figure 3 for installation and removal).

FIG 3. INSTALLATION DIAGRAM

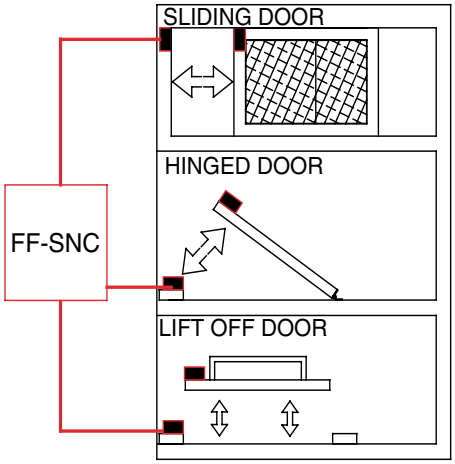


1. The FF-SNC control unit is designed to fit standard 35 mm / 1.37 in symmetric DIN rail.
2. To remove: Place the tip of a small screwdriver into the white catch at the bottom of the box (1) and gently lever out. This releases the retaining clip and allows the unit to be titled (2) and removed (3).

MOUNTING SAFETY SWITCH SENSORS

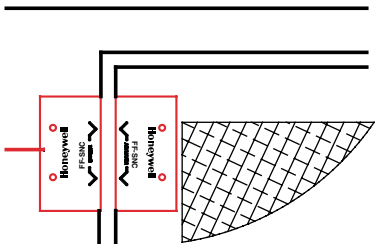
The FF-SNC safety swiches can be fitted to sliding, hinged or removable machine guards. Mount the fixed part of the safety switch to the machine frame and the actuator on to the opening edge of the door ensuring that the targets on the printed faces of the switches are aligned (see Fig. 4).

FIG. 4



GUARD SWITCHES

FIG. 5



GUARD DOOR

The FF-SNC safety switch sensors have 2 fixing holes and are supplied with M4x20 mm Torx Proof screws to be specified.

FIG. 6.

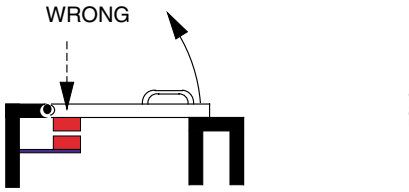
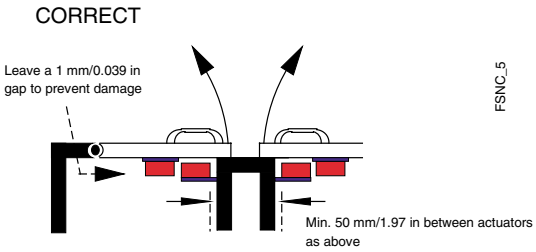


FIG. 7



CAUTION

DO NOT enlarge the fixing holes!

Failure to comply with these instructions will result in product damage.

NOTICE

- Always try to mount the switch and actuator on non-ferrous material. Ferrous materials will reduce the switching distance.
- The sensors should be mounted with a gap of approximately 1 mm/0.039 in (Fig 7). When the guard is closed, this gives a good level of lateral tolerance to allow for "gate sag" and freedom from nuisance tripping due to machine / guard vibration.
- Leave a minimum gap of 50 mm/1.97 in between actuators as above (Fig. 7).

⚠ DANGER

IMPROPER HINGED DOOR INSTALLATION

On a hinged door, do not mount the switch and actuator close to the hinge (Fig. 6) in order to prevent the door from being opened while the switch is still in the scanning range specifications (State ON).

Failure to comply with these instructions will result in death or serious injury.

⚠ WARNING

IMPROPER SWITCH INSTALLATION

EN 1088 provides some mounting suggestions, see examples below.

When fixing the switches to a sliding door (see Fig. 8), ensure that when the door is opened (see Fig. 9), the switch is not easily accessible, helping prevent the system from being overridden.

Failure to comply with these instructions will result in death or serious injury.

FIG. 8.

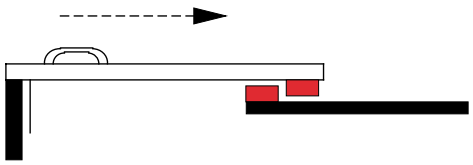
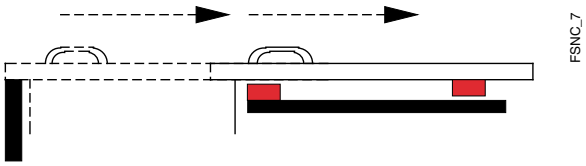


FIG. 9.



Refer to the European standards EN 811, EN 953, EN 294.

⚠ DANGER

IMPROPER EXTENSION MODULE WIRING AND SET UP

- NEVER use the FF-SNC1EXT extension module as a stand alone module. It must be connected to the FF-SNC400R2, FF-SNC400RE or FF-SNC200R2 master module, to operate correctly.
- Generally speaking, do NOT use the FF-SNC1EXT extension module if the master module (FF-SNC400R2, FF-SNC400RE or FF-SNC200R2) can support all sensors needed in the application.
- When use of the FF-SNC1EXT extension module is required, it should be connected to the last input available on the master module, ie "gate 4" for the FF-SNC400R2 or FF-SNC400RE or "gate 2" on the FF-SNC200R2.
- If exceptionaly the FF-SNC1EXT extension had to be used although inputs available on the master module are not all used, make sure the extension module is connected to the next available input. For example, if only 2 sensors are connected on the FF-SNC400R2 4-gate master module, the sensors would have to be connected to "gate 1" and "gate 2" inputs and the extension module would have to be connected to "gate 3".
- Selector switches on the extension module and on the master module should always be positioned to reflect and match the exact number of inputs in use, whatever is connected to these inputs (a sensor or an extension module).
- When installing or modifying an FF-SNC system, ALWAYS test correct operation by opening and closing each gate separately. When all gates are closed and the master module reset, the master module safety outputs 13-14 & 23-24 should be ON. When any of the gates is opened, the safety outputs 13-14 & 23-24 should go OFF.

Failure to comply with these instructions will result in death or serious injury.

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LID REMOVAL AND SWITCH SELECTION

⚠ WARNING

ELECTRICAL SHOCK

- Remove power from FF-SNC switches and before setup. Ensure that installation is performed by qualified personnel.

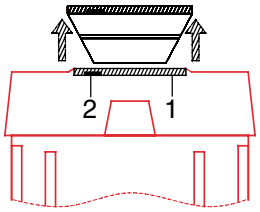
Failure to comply with these instructions could result in death or serious injury.

This module offers the capability to function in the automatic start mode or manual start mode. **To set the desired mode of operation, insert the start push-button between terminals X1/X2 for manual start mode or insert a jumper between X1/X2 for automatic start mode to function.**

LID REMOVAL

The central part of the FF-SNC lid (1) is removable. Using a small screwdriver in the recess (2) gently prise the lid upwards.
This allows access to the Guard Selector Switch (See Fig. 11 to 13) and to the automatic and restart mode selector switch.

FIG. 10.



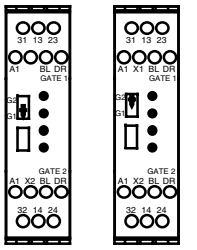
FSNC_9

SWITCH SELECTION

Using the GATE SWITCH SELECTOR Switch, set the FF-SNC to the required number of inputs.

NOTE: the number of inputs (safety switches) must match the gate selector setting. Any difference will prevent the system from operating.

Active Gate Selection
FF-SNC200R2

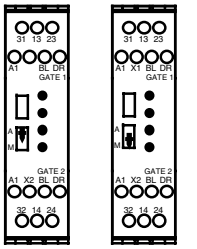


FSNC_24

FIG. 11. Selector switch down for 1 gate operation

FIG. 12. Selector switch up for 2 gate operation

Automatic/Manual restart:
Using the AUTOMATIC / MANUAL SELECTOR Switch, set the FF-SNC to the required restart mode.



FSNC_25

	FF-SNC200	FF-SNC400
Auto	**A (up)**	**A (down)**
Manual	**M (down)**	**M (up)**

FIG. 13. Selector switch up for automatic restart

FIG. 14. Selector switch down for manual restart

MODE SETTING LED INDICATORS

FIG. 15. FF-SNC400R❑ active gate selection

Gate Selector Switch	Operation
2 3 4	1 Gate Operation Yellow LED No.1 will illuminate when gate switch 1 is closed When no Green LED's are illuminated only the first gate input is activated
2 / 3 4	2 Gate Operation Yellow LED's No.1 & No.2 will illuminate when the corresponding gate switch is closed The top Green LED will be illuminated to show 2 gate inputs are activated
2 3 / 4	3 Gate Operation Yellow LED's No.1, 2 & 3 will illuminate when the corresponding gate switch is closed The top 2 Green LED's will be illuminated to show 3 gate inputs are activated
2 3 4	4 Gate Operation Yellow LED's No.1,2,3 & 4 will illuminate when the corresponding gate switch is closed All three Green LED's will be illuminated to show all 4 gate inputs are activated

FSNC_14

FIG 16. FF-SNC1EXT active gate selection*

Gate Selector Switch	Operation
G2 G3 G4 G5	1 Gate Operation Yellow LED No.1 will illuminate when gate switch 1 is closed When no Green LED's are illuminated only the first gate input is activated
G2 G3 G4 G5	2 Gate Operation Yellow LED's No.1 & No.2 will illuminate when the corresponding gate switch is closed The top Green LED will be illuminated to show 2 gate inputs are activated
G2 G3 G4 G5	3 Gate Operation Yellow LED's No.1, 2 & 3 will illuminate when the corresponding gate switch is closed The top 2 Green LED's will be illuminated to show 3 gate inputs are activated
G2 G3 G4 G5	4 Gate Operation Yellow LED's No.1,2,3 & 4 will illuminate when the corresponding gate switch is closed All three Green LED's will be illuminated to show all 4 gate inputs are activated
G2 G3 G4 G5	5 Gate Operation Yellow LED's No.1,2,3,4 & 5 will illuminate when the corresponding gate switch is closed All four Green LED's will be illuminated to show all 5 gate inputs are activated

FSNC_15

*If an extension module is connected, it has to be taken into account when selecting active gates.

Safety Distance Calculations per US ANSI / OSHA standard

$$Ds = K(Ts + Tc + Tr) + Dpf$$

With:

Ds = minimum safe distance between safeguarding device and hazard

K = speed constant: 1,6 m/sec (63 in/sec) minimum based on the movement being the hand/arm only and the body being stationary (a greater value may be required in specific applications and when body motion must also be considered)

Ts = worst stopping time of the machine/equipment

Tc = worst stopping time of the control system

Tr = response time of the safeguarding device including its interface (Tr for interlocked barrier may include a delay due to actuation. This delay may result in Tr being a deduct– negative value).

Dpf = the "Depth penetration factor" is the maximum travel towards the hazard if the guard can be opened a certain width or amount before a stop is signaled.

Dpf values from OSHA O-10 Table

If the maximum width or diameter of the opening is less than or equal to (mm/in):	Dpf equals (mm/ in.)
6,4 / 0.25	12,7 / 0.5
9,5 / 0.375	38,1 / 1.5
12,7 / 0.5	63,5 / 2.5
15,9 / 0.625	88,9 / 3.5
19,1 / 0.75	139,7 / 5.5
22,2 / 0.875	165,1 / 6.5
31,8 / 1.25	190,5 / 7.5
38,1 / 1.5	317,5 / 12.5
47,6 / 1.875	393,7 / 15.5
54,0 / 2.125	444,5 / 17.5
152,4 / 6	800 / 31.5
Above 152,4 / 6	Not allowed

Example: Dpf = 0,5 when the guard can be opened up to, but less than 6,4 mm / 0.25 in before issuing a stop command. Dpf = 444,5 mm / 17.5 in if the guard can be opened 54 mm / 2.125 in. At no time can the opening be greater than 152,4mm / 6 in before issuing a stop command.

For more information, refer to the US regulations and standards (OSHA 29 CFR 1910.212 & 1910.217, ANSI B11.19 and ANSI/RIA R15.06).

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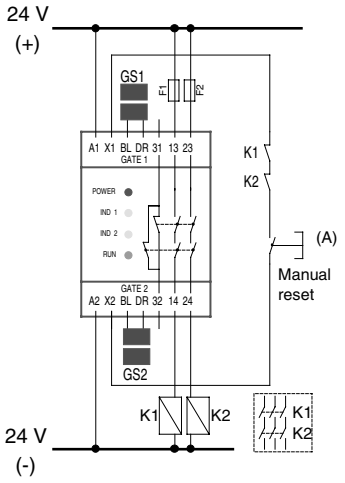
WIRING DIAGRAMS

FF-SNC200R2

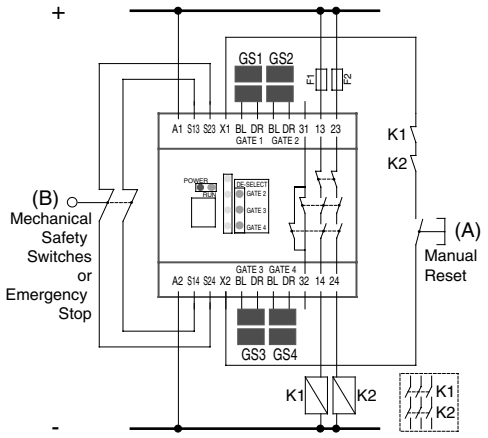
FIG. 17.



FSNC_16EN

FF-SNC400R2/FF-SNC400RE

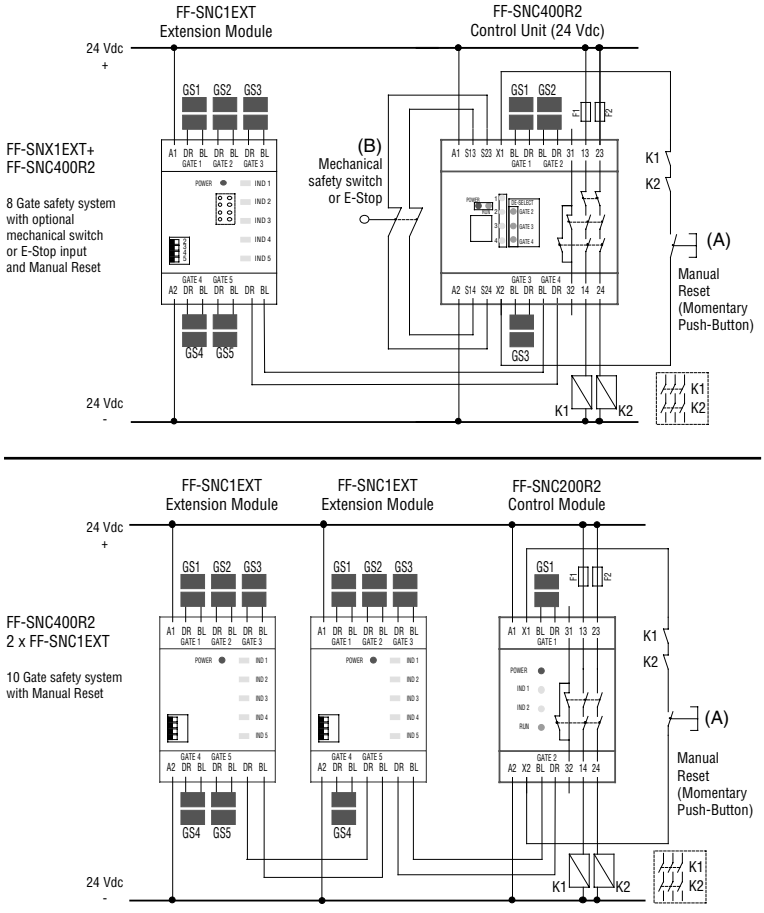
FIG. 18.



FSNC_17EN

Wiring diagram with FF-SNC1EXT Extension Module

FIG. 19.



FSNC_23EN

(A) if the automatic restart is set, X1 and X2 must be jumpered for correct operation.
(B) If a Mechanical Safety Switch or an Emergency Stop is not used, S13/S14 and S23/S24 must be jumpered for correct operation.

APPLICATION NOTES

Up to 28 gates can be protected, using extension modules.

The extension module must be connected to the BL/DR terminals corresponding to the last gate on the master module.

WARRANTY AND REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is **in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.**

While we provide application assistance, personally and through our literature and the Honeywell Website, it is up to the customer to determine the suitability of the product in the application.
Specifications may change at any time without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

SALES AND SERVICE

For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or call:

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+ 49 (0) 69 8064 442	Germany
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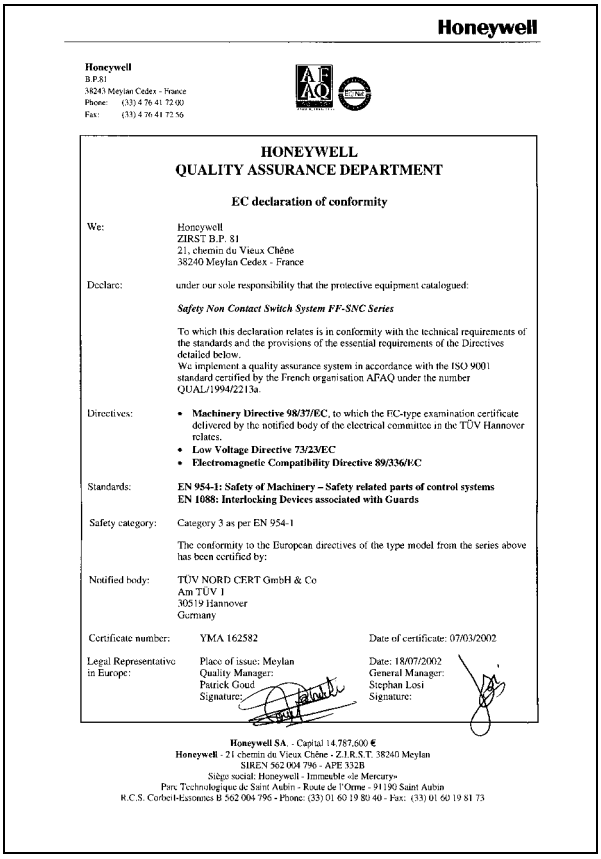
+ 44 (0) 1698 481 276	UK
+ 1-815-235-6545	USA

INTERNET

http://www.honeywell.com/sensing/
info.sc@honeywell.com

EC DECLARATION OF CONFORMITY



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HONEYWELL
QUALITY ASSURANCE DEPARTMENT

EC declaration of conformity

We: Honeywell
ZIRST B.P. 81
21, chemin du Vieux Chêne
38240 Meylan Cedex - France

Declare: under our sole responsibility that the protective equipment catalogued:

Safety Non Contact Switch System FF-SNC Series

To which this declaration relates is in conformity with the technical requirements of the standards and the provisions of the essential requirements of the Directives detailed below.
We implement a quality assurance system in accordance with the ISO 9001 standard certified by the French organisation AFAQ under the number QUAL/1994/2213a.

Directives:
- **Machinery Directive 98/37/EC**, to which the EC-type examination certificate delivered by the notified body of the electrical committee in the TÜV Hannover relates.
- **Low Voltage Directive 73/23/EC**
- **Electromagnetic Compatibility Directive 89/336/EC**

Standards: **EN 954-1: Safety of Machinery – Safety related parts of control systems**
EN 1088: Interlocking Devices associated with Guards

Safety category: Category 3 as per EN 954-1

The conformity to the European directives of the type model from the series above has been certified by:

Notified body: TÜV NORD CERT GmbH & Co
Am TÜV 1
30519 Hannover
Germany

Certificate number: YMA 162582 Date of certificate: 07/03/2002

Legal Representative in Europe: Place of issue: Meylan Date: 18/07/2002
Quality Manager: Patrick Goud Signature: General Manager: Stephan Losi Signature:

Honeywell SA - Capital 14.787.600 €
Honeywell - 21 chemin du Vieux Chêne - Z.I.R.S.T. 38240 Meylan
SIREN 562 004 796 - APE 332B
Siège social: Honeywell - Immeuble «le Mercury»
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